

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
7 December 2000 (07.12.2000)

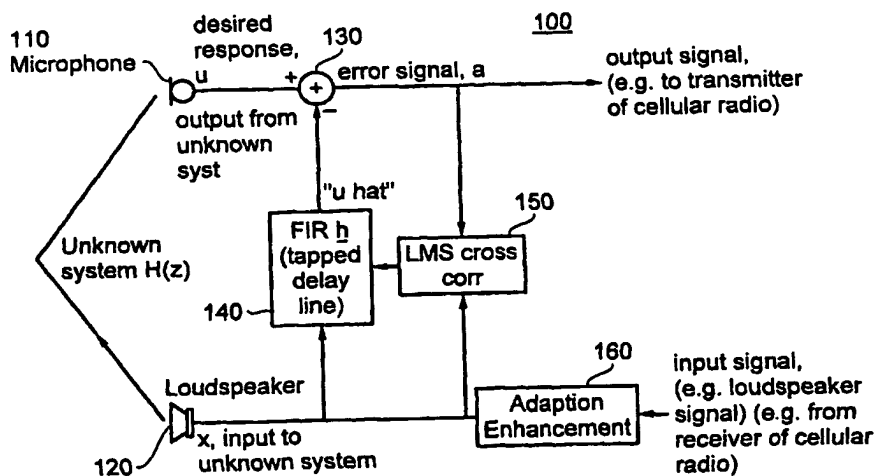
PCT

(10) International Publication Number
WO 00/74362 A3

- (51) International Patent Classification⁷: **H04M 9/08**
- (21) International Application Number: **PCT/EP00/04666**
- (22) International Filing Date: **23 May 2000 (23.05.2000)**
- (25) Filing Language: **English**
- (26) Publication Language: **English**
- (30) Priority Data:
09/320,659 **27 May 1999 (27.05.1999)** **US**
- (71) Applicant: **TELEFONAKTIEBOLAGET LM ERICSSON (publ) [SE/SE]; S-126 25 Stockholm (SE).**
- (72) Inventor: **RASMUSSEN, Jim; Villa Haga, V Ingelstad, S-235 41 Vellinge (SE).**
- (74) Agent: **ERICSSON MOBILE PLATFORMS AB; SE-221 83 Lund (SE).**
- (81) Designated States (*national*): **AE, AG, AL, AM, AT, AT (utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, CZ (utility model), DE, DE (utility model), DK, DK (utility model), DM, DZ, EE, EE (utility model), ES, FI, FI (utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.**
- (84) Designated States (*regional*): **ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).**
- Published:
— with international search report
- (88) Date of publication of the international search report:
28 March 2002

[Continued on next page]

(54) Title: **METHODS AND APPARATUS FOR IMPROVING ADAPTIVE FILTER PERFORMANCE BY INCLUSION OF IN-AUDIBLE INFORMATION**



(57) Abstract: Adaptive filtering algorithm training signals incorporate adaptation-enhancing signals having properties, such as spectral whiteness and rapidly decaying auto-correlation between samples, which allow the adaptive filtering algorithms to converge more quickly as compared to conventional algorithms. Exemplary adaptation-enhancing signals are incorporated such that the training signals are not perceptibly altered as compared to conventional training signals. For example, in a hands-free telephony application, an adaptation-enhancing signal according to the invention is dynamically tailored so that it is masked by a loudspeaker signal (the conventional training signal) and is thus inaudible to hands-free telephone users.

WO 00/74362 A3

WO 00/74362 A3



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

Interr 1st Application No
PCT/EP 00/04666

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04M9/08 H04B3/23

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04M H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 708 536 A (NIPPON TELEGRAPH & TELEPHONE) 24 April 1996 (1996-04-24) abstract; figure 3 ---	1-28
A	FR 2 762 467 A (FRANCE TELECOM) 23 October 1998 (1998-10-23) abstract ---	1-28
A	US 4 969 144 A (BLACKWELL STEVEN R ET AL) 6 November 1990 (1990-11-06) abstract --- -/--	1-28

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

22 November 2000

Date of mailing of the international search report

30/11/2000

Name and mailing address of the ISA
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Montalbano, F

INTERNATIONAL SEARCH REPORT

Intern al Application No
PCT/EP 00/04666

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category "	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>TURNER S E: "PASSBAND ECHO CANCELLATION ALGORITHMS FOR HIGH-SPEED MODEMS" PROCEEDINGS OF THE SOUTHEAST CONFERENCE, US, NEW YORK, IEEE, vol. -, 1991, pages 856-860, XP000287062 ISBN: 0-7803-0033-5 figure 6</p> <p>-----</p>	1-28

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 00/04666

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0708536 A	24-04-1996	JP 7303068 A	14-11-1995
		JP 7303064 A	14-11-1995
		JP 7303065 A	14-11-1995
		JP 7303069 A	14-11-1995
		CN 1128592 A	07-08-1996
		WO 9531051 A	16-11-1995
		KR 241708 B	01-02-2000
		US 6061444 A	09-05-2000
		EP 0708537 A	24-04-1996
		WO 9531052 A	16-11-1995
		KR 233077 B	01-12-1999
FR 2762467 A	23-10-1998	EP 0919096 A	02-06-1999
		WO 9847276 A	22-10-1998
US 4969144 A	06-11-1990	NONE	